

## Chapter I: Introduction

We prepared this Regulatory Impact Analysis (RIA) for our final rule on Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements. The purpose of this RIA is to present our estimates of the likely costs, benefits, and industry impacts associated with the implementation of both the Tier 2 vehicle standards and the gasoline sulfur requirements.

This chapter summarizes the events that lead to today's action as well as the provisions incorporated within it. Subsequent chapters in this RIA present the following information:

- **Chapter II** presents the health and welfare concerns of motor vehicle emissions including, ozone (and ozone precursors), particulate matter, and carbon monoxide.
- **Chapter III** summarizes our analysis of the impact of the Tier 2/Sulfur proposal on emission inventories, ozone and visibility levels, and air toxics emissions and exposures.
- **Chapter IV** examines the technological feasibility of the Tier 2 exhaust emissions standards for light-duty vehicles (LDVs) and light-duty trucks (LDTs), as well as the feasibility of removing sulfur from gasoline.
- **Chapter V** talks about the economic impact of the rule, including the impact of the Tier 2 standards on vehicle costs, the impact of the gasoline sulfur requirements on gasoline desulfurization costs, and the combined vehicle and fuel costs per vehicle and nationwide.
- **Chapter VI** discusses the cost-effectiveness of the vehicle and fuel standards. The analysis in this chapter focuses on the costs and emission reductions associated with a single vehicle meeting the Tier 2 emissions standards while operating on low sulfur fuel.
- **Chapter VII** analyzes and estimates the economic impact of the vehicle and fuel standards by defining and quantifying the various expected consequences and representing those consequences in terms of dollars. This analysis provides a means for comparing the expected benefits of the standards to the expected costs.
- **Chapter VIII** concludes this RIA with a presentation of the Final Regulatory Flexibility Analysis for the rule. This analysis evaluates the impacts of the Tier 2 and gasoline sulfur standards on small businesses.

### A. Background Information for Today's Final Rule

Through the Clean Air Act, Congress directed EPA to assess the air quality need,

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technical feasibility, and cost-effectiveness of more stringent motor vehicle emission standards—emission standards more stringent than federal “Tier 1” standards. On July 31, 1998, we submitted our *Tier 2 Report to Congress*, a formal report which contained the results of our draft Tier 2 Study.<sup>1</sup> In our study, we examined the appropriateness of requiring more stringent emission standards for new passenger cars and light-duty trucks.

The results of the study indicated that, beginning in 2004, emission reductions will be necessary to meet and maintain the National Ambient Air Quality Standards (NAAQS) for both ozone and particulate matter (PM). Air quality modeling showed that during 2007-10, when Tier 2 standards would be fully implemented, several areas in the U.S. would still be in nonattainment for ozone and PM, even after the implementation of existing emission controls. We also found ample evidence that technologies would be available to meet more stringent Tier 2 standards. The Tier 2 Study also provided evidence that such standards could be implemented at a cost (per ton of reduced pollutants) comparable to the costs of other programs designed for similar air quality problems. Finally, the study identified several additional issues in need of further examination, including the relative stringency of car and light truck emission standards, the appropriateness of identical versus different standards for gasoline and diesel vehicles, and the effects of sulfur in gasoline on vehicle catalyst efficiency.

In addition, on May 1, 1998, we released our *Staff Paper on Gasoline Sulfur Issues* which presented our understanding of the impact of gasoline sulfur on emissions from motor vehicles and explored what gasoline producers and automobile manufacturers could do to reduce sulfur’s impact on emissions. The staff paper noted that gasoline sulfur is a catalyst poison and that high sulfur levels in commercial gasoline could affect the ability of future automobiles to meet more stringent standards. It also pointed out that sulfur control would provide additional benefits by lowering emissions from the current fleet of vehicles.

Based on the statutory requirements described above and the evidence provided in the Tier 2 Study, we stated in a Notice of Proposed Rulemaking (May 13, 1999, 64 FR 26004) that new, more stringent emission standards are indeed needed, technologically feasible, and cost effective. In June, 1999, we held four public hearings to obtain feedback on our proposal.

### **B. Overview of the Final Rule**

Today’s final rule, described below, incorporates changes to the proposed program based upon updated analyses as well as comments heard at the public hearings and those submitted in

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<sup>1</sup> On April 28, 1998, We published a notice of availability announcing the release of a draft of the Tier 2 study and requesting comments on the draft. The final report to Congress included a summary and analysis of the comments we received.

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### 1. Vehicle Emission Standards

Today's action sets new federal emission standards ("Tier 2 standards") for passenger cars, light trucks, and larger passenger vehicles. The program is designed to focus on reducing the emissions most responsible for the ozone and particulate matter (PM) impact from these vehicles -- nitrogen oxides (NO<sub>x</sub>) and non-methane organic gases (NMOG), consisting primarily of hydrocarbons (HC) and contributing to ambient volatile organic compounds (VOC). The program will also, for the first time, apply the same set of federal standards to all passenger cars, light trucks, and medium-duty passenger vehicles. Light trucks include "light light-duty trucks" (or LLDTs), rated at less than 6000 pounds gross vehicle weight and "heavy light-duty trucks" (or HLDTs), rated at more than 6000 pounds gross vehicle weight).<sup>2</sup> "Medium-duty passenger vehicles" (or MDPVs) form a new class of vehicles introduced by this rule that includes SUVs and passenger vans rated at between 8,500 and 10,000 GVWR. The program thus ensures that essentially all vehicles designed for passenger use in the future will be very clean vehicles.

The Tier 2 standards finalized today will reduce new vehicle NO<sub>x</sub> levels to an average of 0.07 grams per mile (g/mi). For new passenger cars and light LDTs, these standards will phase in beginning in 2004, with the standards to be fully phased in by 2007.<sup>3</sup> For heavy LDTs and MDPVs, the Tier 2 standards will be phased in beginning in 2008, with full compliance in 2009.

During the phase-in period from 2004-2007, all passenger cars and light LDTs not certified to the primary Tier 2 standards will have to meet an interim average standard of 0.30 g/mi NO<sub>x</sub>, equivalent to the current NLEV standards for LDVs.<sup>4</sup> During the period 2004-2008, heavy LDTs and MDPVs not certified to the final Tier 2 standards will phase in to an interim program with an average standard of 0.20 g/mi NO<sub>x</sub>, with those not covered by the phase-in meeting a per-vehicle standard (i.e., an emissions "cap") of 0.60 g/mi NO<sub>x</sub> (for HLDTs) and 0.09 g/mi NO<sub>x</sub> (for MDPVs). The average standards for NO<sub>x</sub> will allow manufacturers to comply with the very stringent new standards in a flexible way, assuring that the average emissions of a

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<sup>2</sup> A vehicle's "Gross Vehicle Weight Rating," or GVWR, is the curb weight of the vehicle plus its maximum recommended load of passengers and cargo.

<sup>3</sup> By comparison, the NO<sub>x</sub> standards for the National Low Emission Vehicle (NLEV) program, which will be in place nationally in 2001, range from 0.30 g/mi for passenger cars to 0.50 g/mi for medium-sized light trucks (larger light trucks are not covered). For further comparison, the standards met by today's Tier 1 vehicles range from 0.60 g/mi to 1.53 g/mi.

<sup>4</sup> There are also NMOG standards associated with both the interim and Tier 2 standards. The NMOG standards vary depending on which of various individual sets of emission standards manufacturers choose to use in complying with the average NO<sub>x</sub> standard. This "bin" approach is described more fully in section IV.B. of this preamble.

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company's production meet the target emission levels while allowing the manufacturer to choose from several more- and less-stringent emission categories for certification.

We are also setting stringent particulate matter standards that will be especially important if there is substantial future growth in the sales of diesel vehicles. With higher sales of diesel cars and light trucks, these vehicles could easily contribute between one-half and two percent of the PM<sub>10</sub> concentration allowed by the NAAQS, with some possibility that the contribution could be as high as five to 40 percent in some roadside situations with heavy traffic. These increases would make attainment even more difficult for eight counties which we already predict to need further emission reductions even without an increase in diesel sales, and would put at risk another 18 counties which are now within 10 percent of a NAAQS violation. Thus, by including a more stringent PM standard in the program finalized today, we help address environmental concerns about the potential growth in the numbers of light-duty diesels on the road -- even if that growth is substantial. The new requirements also include more stringent hydrocarbon controls (exhaust NMOG and evaporative emissions standards).

### **2. Gasoline Sulfur Standards**

The other major part of today's action will significantly reduce average gasoline sulfur levels nationwide. We expect these reductions could begin to phase in as early as 2000, with full compliance for most refiners occurring by 2006. Refiners will generally install advanced refining equipment to remove sulfur during the production of gasoline. Importers of gasoline will be required to import and market only gasoline meeting the sulfur limits. Temporary, less stringent standards will apply to refineries who produce fuel for use in the Geographic Phase-in Area<sup>5</sup> through 2006 and a few small refiners through 2007.

This significant new control of gasoline sulfur content will have two important effects. The lower sulfur levels will enable the much-improved emission control technology necessary to meet the stringent vehicle standards of today's rule to operate effectively over the useful life of the new vehicles. In addition, as soon as the lower sulfur gasoline is available, all gasoline vehicles already on the road will have reduced emissions -- from less degradation of their catalytic converters and from fewer sulfur compounds in the exhaust.

Today's action will require that most refiners and importers meet a corporate average gasoline sulfur standard of 120 ppm and a cap of 300 ppm beginning in 2004. By 2006, the cap will be reduced to 80 ppm and most refineries must produce gasoline averaging no more than 30 ppm sulfur. The program builds upon the existing regulations covering gasoline composition as it relates to emissions performance. It includes provisions for trading of sulfur credits, increasing the flexibility available to refiners for complying with the new requirements. We intend for the

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<sup>5</sup>Alaska, Colorado, Idaho, Montana, New Mexico, North Dakota, Utah, and Wyoming

credit program to ease compliance uncertainties by providing refiners the flexibility to phase in early controls in 2000-2003 and use credits gained in these years to delay some control until as late as 2006. As finalized today, the program will achieve the needed environmental benefits while providing substantial flexibility to refiners.